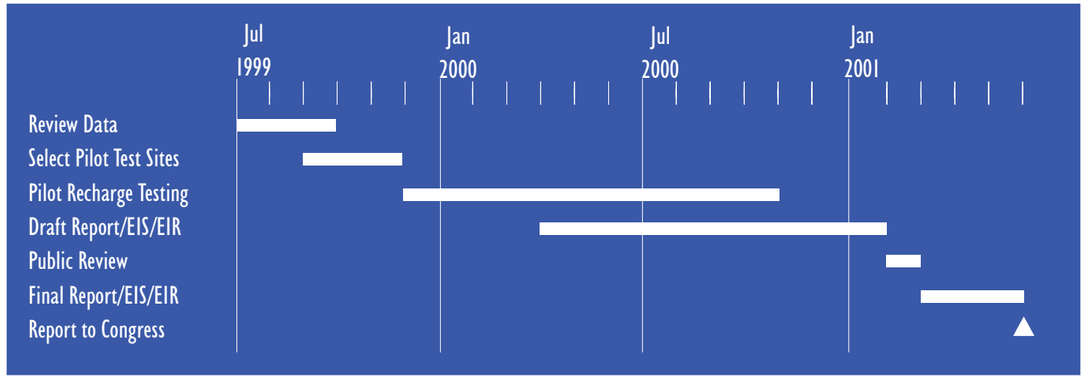
Study Management

The Farmington Groundwater Recharge and Wetlands Feasibility Study is a joint effort by the Corps of Engineers and a group of local sponsors. A Study Management Team and Executive Coordinating Committee provide guidance and oversight for the study.

Study Partners

- U.S. Army Corps of Engineers
- Stockton East Water District
- Central San Joaquin Water Conservation District
- North San Joaquin Water Conservation District
- City of Stockton
- San Joaquin County
- California Water Service Company

Schedule



For More Information

For additional information on the Farmington Groundwater Recharge and Wetlands Feasibility Study, please contact the study management team or visit the Farmington Groundwater Recharge and Wetlands Feasibility Study web-site. Links are available on the Corps of Engineers web-site (www.spk.army.mil/civ/civ.html) and the Stockton East Water District web-site (www.sewd.net).

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FARMINGTON

Groundwater Recharge
and
Wetlands Feasiblity Study

Newsletter

Issue 2 - Summer 2000

Pilot Tests are a Success

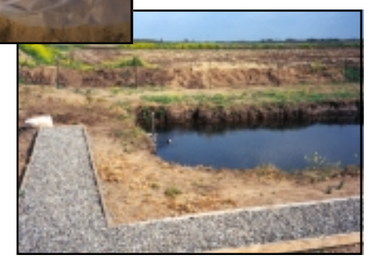
Pilot testing of groundwater recharge began in December 1999 at four test sites in the study area. Three techniques were tested, each at multiple sites. Techniques tested included field flooding, shallow basins, and excavated pits. The locations of test sites and the recharge techniques tested were specifically selected to evaluate recharge effectiveness under the variety of soils conditions present in the study area.

Deep pits were excavated at sites where hardpan was present at depths of five feet or greater below ground surface to measure infiltration rates of soils below the hardpan layer. **Spreading basins** were excavated at sites where thick clay soils were present near the surface. **Field flooding** was tested under all soils conditions, ranging from sites with a well-developed hardpan layer to sites where hardpan is not present.

Measured infiltration rates ranged from a low of less than 0.1 ft/day up to 3.5 ft/day. In general, the tests show that short-term infiltration rates of about 0.75 ft/day were realized under all test conditions except test areas underlain with a thick hardpan layer. Short-term rates were measured over a 3-month period of continuous testing, but probably do not reflect long-term conditions. It is likely that long-term rates would be lower because sediment accumulation and soil saturation - two conditions that develop over longer periods - will retard water infiltration.

The experience at other groundwater recharge sites in California suggests that projects should be designed using more conservative estimates than pilot test results provide. For this study, a range of infiltration rates from 0.25 to 0.5 ft/day will be used to evaluate project sizes and costs. Demonstration-scale recharge projects that are operated over a period of one or more years will provide more accurate information of site-specific rates and operational criteria.

Flooded Field Test Site



Spreading Basin Test Site

In This Issue:

Field Flooding is Most Cost Effective Approach

Pilot test results and preliminary cost estimates show that field flooding is the most cost-effective technique to accomplish percolation recharge. The rate of recharge for flooded fields is lower than some other techniques, but the cost is also lower than techniques that involve more extensive construction, operations, and maintenance.

Technique	Percolation Rate (ft/day)
Flooded Field - over Hardpan	0.03
Flooded Field	0.75 - 0.8
Spreading Basin	0.8 - 1.5
Excavated Pit	0.75 - 3.5

Flooded fields also provide greater seasonal wetland benefits than the other methods considered. On flooded fields, water depths can be easily maintained between zero to 10 inches, which provides the most desirable habitat for migrating waterfowl.

Feasibility Report Preparation Has Begun

Work has started on preparation of the Farmington Groundwater Recharge and Wetlands Feasibility Study Report. The study team has been working on several key elements that form the basis for the report.

Problems and Opportunities

Groundwater overdraft in Eastern San Joaquin County has allowed the eastward migration of saline water to the aquifer. In some areas beneath the City of Stockton, salinity concentrations in groundwater exceed public health standards and this groundwater cannot be served to domestic water users. If no action is taken to reduce the rate of salinity intrusion, additional urban water supplies will be lost and surrounding agricultural production will be spoiled.

An opportunity exists to simultaneously reduce the rate of saline migration through groundwater recharge and provide seasonal wetlands in the study area. Seasonal wetlands provide valuable winter habitat to migratory waterfowl along the Pacific Flyway. This study will consider supplies available during the flood season and unused irrigation supplies.

Primary Objectives

The Feasibility Report will focus on the two co-equal objectives of this study.

- **Decrease salinity intrusion by reducing overdraft.** Groundwater recharge would help alleviate overdraft of groundwater and thereby reduce the rate of saline water migration. This feasibility study will consider how recharge in different portions of the study area affects the rate of saline water migration.
- **Increase the area of seasonal wetlands.** The US Fish and Wildlife Service and environmental interest groups including Ducks Unlimited support an increase in seasonal wetland habitat in Eastern San Joaquin County. The additional seasonal wetlands would benefit local and migrating waterfowl along the Pacific Flyway. Shallow wetland habitats that provide food supplies are preferable to deep ponds or wetlands that provide less opportunity for nourishment.

Secondary Objectives

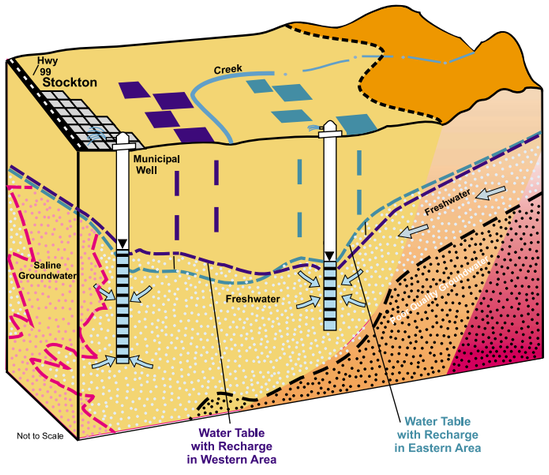
It is anticipated that achieving the two primary study objectives will help the local partners realize two additional important objectives.

- **Increase the use of existing water supplies.** Eastern San Joaquin County has been working toward maximizing the use of surface water supplies for many years. This project is considering opportunities to divert flood flows and portions of existing supplies that are not being used. Although the water supplies being considered in this study will not be sufficient to balance supplies and demands, the groundwater recharge component of this project can contribute toward that goal.
- **Increase flood protection of existing projects.** The diversion of flood waters to recharge and wetland areas could reduce instream flows or enhance the evacuation of water from flood control space in existing facilities. Increased flexibility in the operation of flood damage reduction facilities could provide both economic and environmental benefits.

Estimating Project Benefits

Alternative approaches to accomplish groundwater recharge and wetlands development will be compared in the Feasibility Report. Measures that provide the greatest economic and environmental benefits will be identified and incorporated in a base project plan. Benefits of the plan will be described in both monetary and non-monetary terms to address the following concerns.

- **Changes in Saline Groundwater Migration.** Saline water migration in the western portion of the groundwater overdraft area is caused by a steeply-sloped groundwater surface. Reducing the slope of the water table will reduce the rate of saline water migration. Groundwater recharge in the western portion of the study area would have a greater effect on reducing saline water migration than recharge elsewhere in the study area.



- **Change in Groundwater Elevation.** The addition of water to the aquifer through recharge will raise groundwater levels in some areas. As groundwater levels rise, pumping costs decrease. Reducing the amount of overdraft also reduces the potential for future damages from land subsidence.
- **Seasonal Wetlands Created.** The area of seasonal wetlands that can be created will be identified. A variety of wetland types could be developed depending on the availability of the water supply and land use practices. For example, permanently dedicated lands could be managed to provide seasonal wetlands in the winter and native habitat


Flooded Field with Shallow Water and Vegetative Growth

in the summer. These sites could be complemented with seasonally flooded fields that may be developed under an annual leasing program.

Base Project Plan

The Base Project Plan will describe a groundwater recharge and wetlands project that can be developed with existing water supplies. It is anticipated that the base project plan will include flooded fields on lands acquired in fee and on leased lands. The amount of land that would be needed for recharge of regularly available water supplies would be acquired in fee.

As summarized below, several sources of available water supplies are being considered. In total, these sources can provide an average of about 25,000 acre-feet per year. During wet years when substantially more water is available, additional recharge may be possible through the use of seasonal field flooding leases.

Watershed	Flood-Season	Irrigation Season
Stanislaus River	Flood releases from New Melones Reservoir that can be routed through Farmington Reservoir	Flood-Unused portion of CVP water supply allocation
Littlejohn Creek	Local inflow to Farmington Reservoir after meeting instream flow requirements on Littlejohn and Rock Creeks	None
Calaveras River	Flood releases from New Hogan Reservoir	Unused portion of existing New Hogan Supply
Mokelumne River	None	Unused portion of North San Joaquin Water Conservation District water right